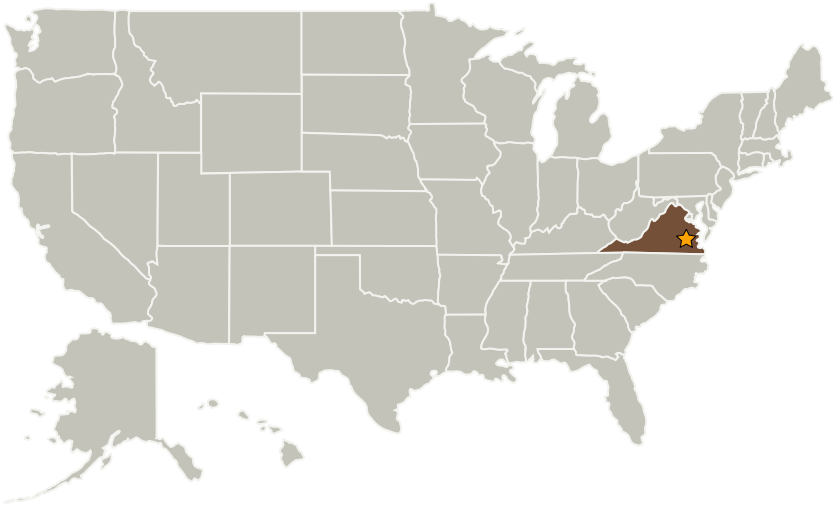
Damage Adaptation Using Integrated Structural, Propulsion, and Aerodynamic Control, Phase II

Completed Technology Project (2007 - 2009)

Project Introduction

Over the past decade, researchers have been making great strides in the development of algorithms that detect and compensate for damaged aircraft. Before these algorithms can be used in civil aviation, progress is needed to (a) ensure that these innovative and frequently non-deterministic algorithms will always perform as expected and (b) address challenges associated with integrating these algorithms into an overall avionics system. The authors addressed the second challenge by developing an integration approach called Operational Envelope Safety Assurance (OESA). In Phase I, the authors showed that OESA can integrate control, path planning, diagnostics, and structural health monitoring algorithms in a way that ensures the subsystems will never issue commands that put the aircraft outside its safe-operating envelope. In Phase II, the authors will formalize the approach, develop a general set of OESA subsystem specifications, and demonstrate safe integration of algorithms developed by other researchers under related research efforts. Phase II will culminate in real-time high-fidelity demonstrations of an integrated controller for a NASA testbed (either the Langley AirSTAR GTM or the Dryden A-53 F-18 testbed) and will set the stage for Phase III flight tests.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Barron Associates, Inc.	Supporting Organization	Industry	Charlottesville, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

November 2007: Project Start

November 2009: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.6 Fault Response